



**Comments and Responses on Associated Electric Cooperative,
Inc. – New Madrid Power Plant’s
Prevention of Significant Deterioration (PSD) New Source
Review Permit
Project Number 2006-06-026**

This document responds to comments made to the PSD draft permit. Comments have been summarized or paraphrased for the sake of clarity. The numbers of Special Conditions in the comments may have changed. The numbers referenced in the response reflect the final Special Condition numbering.

The following comments were submitted to the Air Pollution Control Program by the Environmental Protection Agency (EPA), Region VII in a letter dated August 31, 2006:

Comment: CO BACT Limit

“The permit application proposes a CO best available technology (BACT) limit of 0.70 lb/mmBtu. Following review of the application, Missouri Department of Natural Resources (MDNR) proposes in Condition 1 of the draft permit to lower the CO BACT limit to 0.55 lb/mmBtu, 30-day rolling average. While we agree that the record clearly establishes that “combustion control” is the appropriate technology for BACT, we believe that the record is unclear with respect to the BACT limit itself.

A number of similar Prevention of Significant Deterioration (PSD) permit for NOx retrofit projects establish limits well below those in the Associated Electric Cooperative, Inc. (AECI) permit. Therefore, it is appropriate to provide an explanation in the record on what factors make the New Madrid units unique and why they are incapable of achieving these lower levels. For example, at Jeffrey Unit 3, the Kansas Department of Health and Environment set a CO BACT limit of 0.25 lb/mmBtu in its October '05 PSD permit <see http://www.epa.gov/region07/programs/artd/air/nsr/archives/2005/finalpermits/westar_jeffrey_pcp_final_psd_permit.pdf>. Likewise, the Iowa Department of Natural Resources has established CO BACT limits for LNB and OFA retrofits in the 0.385 to 0.42 range and as high as 1.27 lb/mmBtu for earlier pollution control projects. As you note in the permit summary for the New Madrid permit, Nebraska is currently evaluating a similar project and has proposed CO BACT at 0.50 lb/mmBtu. While these projects represent a significant range of emissions, and may indeed reflect the individual characteristics of each boiler, the New Madrid record does not appear to provide any distinguishing factors that would argue for the higher CO BACT limit; or even the lower limit ultimately established by the department.

We understand that the cyclone design at New Madrid may well have an influence on CO emissions, as it does with NOx, and may have inherently higher emissions. This would be an appropriate factor to consider in the record. Likewise, the New Madrid units have been retrofitted with selective catalytic reduction (SCR) devices to minimize NOx and these too may have an impact on CO emissions. Therefore, we recommend that the department supplement the record with additional analysis that explains why the New Madrid units are incapable of meeting 0.45, 0.40, 0.35 or some lower threshold for CO. Any engineering analysis, vendor studies, or other information from similar retrofit units would be a useful supplement to the record.”



MDNR's Response:

The department agrees that the record needs enhancement with regard to the reasoning behind the establishment of the CO BACT emission limit level. During review of the permit application, the permitting agencies responsible for each permit found in the RBLC Database were contacted. Two units in Iowa have been permitted: the Mid-American George Neal Energy South unit at 0.42 lb/mmBtu and the Neal North unit at 1.26 lb/mmBtu. Nebraska Public Power District recently received a permit for low-NOx burners at their Gerald Gentleman Station with a limit of 0.50 lb/mmBtu. Two Detroit Edison units in the state of Michigan received CO limits equivalent to less than 0.3 lb/mmBtu. The only unit that is a cyclone boiler is the Neal North unit, which was permitted at 1.26 lb/mmBtu. The New Madrid unit's limit is well below the permitted cyclone unit in Iowa.

The main purpose for installing OFA controls is to minimize NOx emissions. Reductions in NOx emissions will be substantial, so great that for each permitted source, the permitting authority has deemed it appropriate to use the CO emissions limit proposed by the applicant, and presumably, based on engineering analysis completed by the company and its vendors.

Recent legislation has served to accomplish two things. No longer are pollution control projects exempted from BACT review should emissions of any pollutant exceed the significant threshold. Secondly, existing installations are being forced to drastically reduce NOx emissions from utility boilers. CO emissions are a result of incomplete combustion and are inversely related to NOx emissions. While installations are being forced to reduce NOx emissions, it remains in the installation's best interest financially to minimize CO emissions; electric generation per ton of coal combusted decreases with increasing CO emissions.

AECl – New Madrid Power Plant's cyclone boilers are being permitted at the lowest level of CO emissions for boilers of their type.

AECl's Response:

AECl is unaware of any effect that selective catalytic reduction (SCR) may have to CO emissions on large coal-fired utility boilers.

OFA is expected to reduce emissions of nitrogen oxides (NOx) and it is assumed there will be an increase of carbon monoxide (CO) emissions. Following discussions with the MDNR and our engineering consultants (Burns and McDonnell) AECl agreed to reduce the CO limitation from 0.70 lb/mmBtu (see permit application documents submitted June 2, 2006) to a CO emission limit of 0.55 lbs/mmBtu. Associated believes that the emission limit of 0.55 lb/mmBtu is appropriate for the following reasons:

(1) Boiler/Burner Type

The lower permit limits from other Region VII states that EPA cites (Kansas, Nebraska and Iowa) are for PC boilers with low-NOx burners (LNB) and/or OFA. Cyclone boilers are inherently less efficient at combusting coal than pulverized coal (PC) boilers. This inefficiency is recognized in the higher CO emission limit of 0.55 lb/mmBtu. In addition, the boiler was originally engineered for combustion of higher Btu bituminous coal and is smaller/shorter than ideal for burning subbituminous (low sulfur/lower Btu) PRB coal. The smaller boiler does not allow for sufficient residence time (at sufficient temperatures) to convert all CO to CO₂.

Comparison to Jeffrey Unit 3

With respect to the Jeffrey Unit 3 (Kansas), this unit is an 800 MW PC boiler. The combustion modifications at Jeffrey included the addition of low-NOx burners, separated overfire air (SOFA),



and changes to coal pulverizers. The modification of the pulverizers will improve coal fineness and result in improved combustion and lower CO.

The New Madrid units are 600 MW (nominal) cyclone burners that will have overfire air only. New Madrid optimizes the hammermill (coal crushing) operation to the extent possible, but there is no such option to improve the fineness of the coal as with Jeffrey Unit 3. Further, as stated above, the smaller/shorter boiler does not allow for sufficient time and temperatures to convert all CO to CO₂.

(2) Safety and Financial Factors

Associated will maintain CO emissions as low as possible, regardless of the permit limit. In addition to environmental impacts, Associated is also mindful of the safety and financial issues involved with over production of carbon monoxide.

Safety - Elevated levels of carbon monoxide may present an explosive potential. Associated is mindful of our commitment to the safety of our people and property. New Madrid operations will work carefully to keep carbon monoxide emissions as low as practicable while achieving the greatest NO_x reduction possible. This will be achieved through tuning and monitoring of NO_x and CO in the flue gas stream. The certified NO_x and new CO analyzers will be used to monitor and operate the OFA system.

Financial - CO emissions are the result of incomplete combustion. Failure to completely combust coal in the boiler means that Associated is not taking full advantage of the thermal potential of the fuel. In short, CO emissions equal dollars lost to Associated.

(3) Uncertainty

In contrast to back-end control equipment, OFA is a process, not a piece of equipment with vendor guarantees. The CO and NO_x emissions will vary to different degrees depending on ambient conditions, coal grade, and even operator preference. As stated above, Associated will work to tune the process (to the extent possible) and aggressively reduce NO_x emissions while maintaining acceptable levels of CO concentration (see safety and financial discussion above).

Neither Associated nor the DNR possess data to indicate what CO emissions are at present for the New Madrid units. Annual emission totals for the EIQ are based on (potentially non-representative) AP-42 emission rates. It is in neither the best interest of the agency nor that of AECl to permit a project at an emission rate that is not achievable. Further, to constrain CO emissions to levels that would hinder NO_x reductions will only serve to increase the tons of NO_x emitted to the air.

(4) Environmental Impact

The application, as sent to the DNR on June 2, 2006, included all appropriate information and analysis to demonstrate that the OFA projects will not result in a negative impact to the environment. In fact, the SCREEN3 modeling and calculations were based on the more conservative emission rate of 0.70 lb/mmBtu. Sections 6.2/6.6 state:

(Section 6.2) "The modeling shows that CO emissions are not expected to exceed its Modeling Significance Levels at either 70 percent or 100 percent load (*implied – ER = 0.70 #/mmBtu*). According to the Draft EPA New Source Review Workshop Manual, if modeled impacts do not exceed the Modeling Significance Levels, an SIA and a NAAQS modeling analysis is not needed."

(Section 6.6) As shown in Table 6-6, the modeling analysis predicts that there are no exceedances of the Modeling Significance Levels for CO. The installation of OFA at New Madrid's Unit 1 and Unit 2 are not expected to cause or contribute to a modeled exceedance of the NAAQS for CO.



The conclusions stated above are predicated on conservative estimates and according to EPA approved defaults. BACT should therefore be considered "Good Combustion Practices" with an accompanying emission rate limit of 0.55 lb/mmBtu on a 30-day rolling average.

Comment: Use of CEMS and Enhanced Enforceability

"We commend the department's use of CO continuous emission monitors for verification that the CO BACT limits is being met during all periods of operation. We encourage you to build on the requirements in Condition 2 by requiring the CO CEMS to be certified pursuant to 40 CFR Part 60, Appendix B, Performance Specification 4. This assures that the monitor at least meets minimum EPA specifications.

The department may also want to enhance the quality of monitoring data by requiring periodic quality assurance assessments using procedures similar to those in 40 CFR Part 60, Appendix F. Even if the CO Continuous Emission Monitoring System (CEMS) does not undergo annual relative accuracy testing, it could benefit from periodic cylinder gas audits to assure that the measurements can be tied to by National Institute of Standards and Technology-certified calibration gases.

Lastly, while AECl is required to keep records of CEMS data in Condition 2.B, the permit does not appear to require the utility to report periodically on its CO BACT compliance status. Given the uncertainty and wide range of CO BACT emissions limits across the region, it would be beneficial to have AECl provide a CO emissions report for some period of time following the retrofit. For example, it might help inform other CO BACT analyses performed for NOx retrofits occurring under the Clean Air Implementation Rule program. If the data ultimately show that the CO BACT limit is being met with an adequate margin of safety, then it may be appropriate to go to "excess emission" reporting at some point in the future.

In any case, we encourage the department to add some level of reporting so that there is adequate information available to verify compliance without visiting the plant on site."

MDNR's Response:

The Department concurs with EPA's comment. Special conditions have been revised to incorporate CEMS certification, quality assurance practices and reporting.

AECl's Response:

AECl agrees with this comment. AECl intends to adhere to a quality assurance plan that meets the requirements of PS4/4A. The certification program will include daily calibrations, cylinder gas audits (CGA), and RATA testing. RATA testing for Unit 2 will be performed on a schedule amenable to the plant and to our test vendor. This will likely be scheduled with the mobilization for RATA testing at Chamois Power Plant during the fourth quarter of 2006. RATA testing for Unit 1 will be performed in the third quarter of 2007 along with the regularly scheduled tests for the Acid Rain certified CEMS at New Madrid.

AECl will report to the DNR every six months in the semi-annually monitoring (SAM) report and in the annual compliance certification (ACC). Should the DNR request more frequent compliance reporting (e.g. quarterly), AECl will act in accordance with the request.